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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/836,119	04/17/2001	Lin-Feng Li	Reveo-0110USAAPN00	8590

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12/02/2003

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EXAMINER

MERCADO, JULIAN A

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 12/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/836,119

Applicant(s)

LI ET AL.

Examiner

Julian A. Mercado

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5-17,20-31,35-37,39 and 41-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 1,5-17,20-31,37,39 and 42-45 is/are allowed.
- 6) ☐ Claim(s) 35, 36, 41, 46 and 47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Remarks

This Office Action is responsive to applicant's amendment filed September 16, 2003.

Claims 1, 5-17, 20-31, 35-37, 39 and 41-47 are pending.

Claim Objections

The objection to claims 5 and 43 have been withdrawn.

Claim Rejections - 35 USC § 112

The rejection of claims 10, 11, 17, 25 and 26 under 35 U.S.C. 112, second paragraph has been withdrawn.

Claim Rejections - 35 USC § 102

The rejection of claims 1, 2, 17, 42 and 43 under 35 U.S.C. 102(b) based on Buehler has been withdrawn.

To the extent that Buehler may be applicable to independent claims 1 and 17 as currently amended, Buehler does not teach or at least suggest a membrane comprising a composite of a cross-linked polymeric structure and a hydroxide conducting medium.

The rejection of claims 1-3, 17, 18 and 35 under 35 U.S.C. 102(b) based on Struthers has been withdrawn.

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To the extent that Struthers may be applicable to independent claims 1 and 17 as currently amended, Struthers does not teach or at least suggest a membrane comprising a composite of a cross-linked polymeric structure and a hydroxide conducting medium. As to independent claim 35 as currently amended, while Struthers is maintained to teach a membrane which is hydroxide-conducting (col. 5 line 26-40), the patentees does not teach or at least suggest the membrane to be an anion-exchange membrane.

The rejection of claims 1-3, 17 and 18 under 35 U.S.C. 102(b) based on Hashizaki has been withdrawn.

To the extent that Hashizaki may be applicable to independent claims 1 and 17 as currently amended, Hashizaki does not teach or at least suggest a membrane comprising a composite of a cross-linked polymeric structure and a hydroxide conducting medium.

The rejection of claims 1-3, 17, 18, 37, 39, 42 and 43 under 35 U.S.C. 102(b) based on Sterzel has been withdrawn.

To the extent that Sterzel may be applicable to independent claims 1 and 17 as currently amended, Sterzel does not teach or at least suggest a membrane comprising a composite of a cross-linked polymeric structure and a hydroxide conducting medium.

Regarding independent claim 35, the examiner notes that applicant has amended the scope of independent claim 35 so as to recite that a first electrode is in fluid communication with an inlet for receiving a mixture of gas and a second electrode is in fluid communication with an outlet for the first gas. The preamble recites that the electrochemical cell separates a first gas

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from a mixture of gas. By this recitation, the first gas is understood to be present in the mixture of gas at the outset so as to allow for its separation from said mixture. To the extent that Sterzel's teachings may be applicable towards this feature of the claim, the corresponding gases in Sterzel would be a "methanol feed" for the mixture of gas (methanol admixed with air) and the formed carbon dioxide as the first gas. Carbon dioxide, however, is formed *in situ* at the anode (see col. 8 line 5-26), thus, Sterzel does not teach or at least suggest separating of a first gas from a mixture of gas as presently required by the claim.

The rejection of claims 1-3, 17, 18, 32, 33, 35, 36 and 39-41 under 35 U.S.C. 102(e) based on Yao et al. has been withdrawn.

To the extent that Yao et al. may be applicable to independent claims 1, 17 and 35 as currently amended, Yao et al. does not teach or at least suggest a membrane comprising a composite of a cross-linked polymeric structure and a hydroxide conducting medium.

The rejection of claims 1-35 and 37-43 under 35 U.S.C. 102(e) based on Chen et al. has been withdrawn.

To the extent that Chen et al. may be applicable to independent claims 1, 17 and 35 as currently amended, Chen et al. does not teach or at least suggest a first electrode in fluid communication with an inlet for receiving a mixture of gas and a second electrode in fluid communication with an outlet for the first gas. As set forth in the prior Office Action, in Chen et al. the separation of a gas, i.e. oxygen, from a gas mixture, i.e. air, is limited only on the cathode

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side, and not via an inlet and outlet disposed in fluid communication with a respective first and second electrode.

(new rejection)

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 35, 41, 46 and 47 are rejected under 35 U.S.C. 102(b) as being anticipated by Maget. (U.S. Pat. 3,489,670)

Maget teaches an electrochemical cell for separating a first gas from a mixture of gas comprising a first electrode [12] in fluid communication with an inlet [16] for receiving the gas mixture and a second electrode [13] in fluid communication with an outlet [19] for the first gas. (col. 3 line 21-37) A membrane [11] is of the ion-exchanging type. (col. 3 line 23-26) The membrane is disclosed in one embodiment as an anion exchange resin which also transports hydroxyl, i.e. hydroxide ions. (col. 6 line 1-13)

As to dependent claim 41, the separated gas is oxygen. (col. 6 line 1-13) Maget also discloses that the oxygen-containing gas, i.e. mixture of gas, may be air. (col. 3 line 47-51) The examiner notes that air is notoriously known to contain nitrogen, oxygen, carbon dioxide, *inter alia*. The oxygen gas is separated from such a mixture of gases in that O₂ is reduced to hydroxide ion (which crosses the membrane) and then returned to its molecular form as it is oxidized at the anode side. (col. 6 specifically at line 5 and line 9) Thus, oxygen is separated from a mixture of gas.

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As to dependent claims 46 and 47, the cell further comprises a voltage source [20] and conductor [25]. (col. 3 line 28-30 and line 46-47)

Claim Rejections - 35 USC § 103

The rejection of claims 4-8, 11- 14, 19-23, 26-29, 32-34, 40 and 41 under 35 U.S.C. 103(a) based on Sterzel, Andreola et al. and Chabreck et al. has been withdrawn.

The rejection of claims 15, 16, 30 and 31 under 35 U.S.C. 103(a) based on Sterzel, Andreola et al., Chabreck et al. and Itoh et al. has been withdrawn.

(new rejection)

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim 36 is rejected under 35 U.S.C. 103(a) as being obvious over Maget as applied to claims 35, 41, 46 and 47 above in view of Yao et al. (U.S. Pat. 6,183,914 B1)

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the

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application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maget as applied to claims 35, 41, 46 and 47 above in view of Goldstein et al. (U.S. Pat. 4,216,073)

The teachings of Maget are discussed above. The teachings of Yao et al. and Goldstein et al. as they pertain to the instant invention will be discussed in parallel.

Maget does not explicitly teach the anion exchange membrane to comprise a polymer having quaternary salt functional groups. However, Yao et al. or Goldstein et al. teaches a membrane comprising a polymer having quaternary salt functional groups (Yao at col. 5 line 32-50, Goldstein et al. at col. 3 line 53-60). The skilled artisan would find obvious to employ quaternary salt functional groups in Maget's invention for reasons such as ensuring adequate interaction with the hydroxide ion carrier ions and producing an anion selective membrane structure. (Yao et al. at col. 3 line 32 et seq., Goldstein et al. at col. 4 line 37-43)

Response to Arguments

Applicant's arguments filed with the present amendment have been fully considered but they are not persuasive.

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Applicant submits that references relating to fuel cells rather than electrochemical cells for separating gases are not germane to the present invention. As a matter of clarification, in reply the examiner maintains that a fuel cell is indeed an electrochemical cell, and by this line of argument the examiner interprets the claimed invention as an electrochemical cell of the type which requires a voltage source for applying a voltage across the electrodes (such as further recited in dependent claim 46) and not an electrochemical cell (such as a fuel cell) which utilizes an electrochemical reaction to produce a current through an external circuit. That is, the claimed invention is interpreted to require a positive change in Gibbs free energy (thereby precluding electrochemical cells such as fuel cells).

It is noted, however, that this argument is deemed moot in view of the new ground of rejection set forth above based on Magen which, while also employing a fuel cell to utilize the purified O₂ gas, also employs an electrochemical cell of the type claimed by applicant.

As to the rejection based on Yao et al. (rejection based on Chen et al. having been withdrawn), applicant's incorporation of Chen et al. by reference in the parent application does not preclude this reference as qualifying as prior art under 35 U.S.C. 102(e). As stated above, the present ground of rejection relying on Yao et al. as a secondary reference may overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. A positive statement on the record in reference to common ownership will satisfy this provision.

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Allowable Subject Matter

In view of the withdrawal of the prior art rejections for the reasons detailed above, claims 1, 5-17, 20-31, 37, 39 and 42-45 are allowed.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Pat. 3,674,022 to Dounoucos is cited as a related patent to U.S. Pat. 3,489,670 to Maget.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

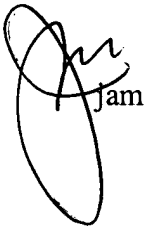
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian A. Mercado whose telephone number is (703) 305-0511.

The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (703) 308-2383. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Julian A. Mercado



Patrick Ryan
Supervisory Patent Examiner
Technology Center 1700